The short attachment to Pets Scale (SAPS) for children and young people

The Short Attachment to Pets Scale (SAPS) for Children and Young People: Development, Psychometric Qualities and Demographic and Health Associations.

Ferran Marsa Sambola[1§], Janine Muldoon[1], Joanne Williams[2], Alistair Lawrence[3], Melanie Connor[3], Candace Currie[1].

[1]Child and Adolescent Health Research Unit (CAHRU), University of St Andrew, St Andrews, Fife, KY16 9TF.

[2]Clinical Psychology; University of Edinburgh, Edinburgh.

[3]Scotland´s Rural College, West Mains Road, Edinburgh EH9 3JG

Email addresses

FMS: fms7@st-andrews.ac.uk

JM: jcm23@st-andrews.ac.uk

JW: Jo.Williams@ed.ac.uk

AL: Alistair.Lawrence@sruc.ac.uk

MC: Melanie.Connor@sruc.ac.uk

CC: cec53@st-andrews.ac.uk

Abstract

BACKGROUND

In recent years, scales to assess attachment between humans and animals have been developed and validated only in adults or in undergraduate students. While it is known that pets may have a direct or indirect positive influence on the development of social and emotional aspects in children and young people, there is a lack of scales to assess attachment to pets in this age group. The Short Attachment to Pets Scale (SAPS) was developed to create a succinct measure of attachment to pets for use in a broad range of research contexts with children and young people.

METHODS

This paper describes the development of the SAPS and investigates its reliability and validity within the context of the Health Behaviour in School-Aged Children Survey (HBSC) which gathered data on representative samples of school pupils aged 11, 13 and 15 in Scotland and England.

RESULTS

In the development of SAPS, following a comprehensive review of the literature, two small-scale empirical studies were carried out (one qualitative and one quantitative). Regarding the validation process, the reliability and validity of the SAPS was assessed in a sub-sample (n=7159) of pupils who completed the HBSC survey and were identified as owning pets. Factor analysis resulted in a one-factor solution (explaining 67.78% of the variance); Cronbach's alpha for the scale was 0.894. The item-total correlation ranged from 0.368 to 0.784. A linear model showed that attachment to pets was associated with age (being 11 or 13 years old), being a girl, white ethnicity, and considering a pet as one's own. SAPS scores were also positively associated with quality of life. The total variance in SAPS explained by

these variables was 15.7%. Effect sizes of associations were medium (age, considering a pet as one's own) and small (ethnicity, age, gender, quality of life).

CONCLUSIONS

The study concludes that SAPS is a coherent and psychometrically sound measure. It is associated with a range of demographic variables and quality of life, which confirms its utility as a new succinct measure of children's and young people's attachment to pets for use in health and social science research.

KEYWORDS: attachment; pets; scale; young people; children; health, HBSC.

1. Introduction

The study of Human–Animal Interactions (HAI) and the psychosocial and physical health outcomes of interactions with animals including pets, is a growing research issue in the social sciences and public health. It has been reported that pet ownership is associated positively with psychological and physiological health outcomes from childhood to adulthood (Headey 1999; McCardle et al. 2011; McNicholas et al. 2005; O'Haire 2010). However, other studies point out that current data is inconclusive due to methodological and conceptual limitations (Herzog 2011). In particular, large-scale health surveys often do not include measures relating to pet ownership and attachment to pets, perhaps because a short robust measure has not previously been available. The aims of this paper are twofold: first, to describe the development of a new Short Attachment to Pets Scale (SAPS) for children and young people and to demonstrate its psychometric properties; and secondly, to examine associations between SAPS and a range of demographic and health variables.

Attachment to Pets among Children and Adolescents

The term attachment in people is frequently defined with reference to Bowlby's theory (1969) that considers attachment as a profound and durable emotional bond that links one person to another across space and time (Ainsworth 1973; Bowlby 1969). Although this concept initially was not related to human-animal relationships, some authors have proposed that such relationships could be similar to interpersonal relationships (Beck and Madresh 2008; Crawford et al. 2006; Nebbe 2001; Rynearson 1978). Human-animal attachment has been conceptualised "as the emotional bond felt and expressed between a pet and its owner"(Budge et al. 1998).

In recent years, scales to assess attachment between humans and animals have been developed (Kafer et al. 1995; Staats et al. 1996) and validated only in adults or in undergraduate students. While it is known that pets may have a direct or indirect positive influence on the development of social and emotional aspects in children and young people (Crawford et al. 2006; Kruger et al. 2012), there is a lack of scales to assess attachment to pets in this age group which are validated for use in health surveys such as the Health Behaviour in School-aged Children Survey (HBSC).

Research on adult human–pet interactions shows that these relationships frequently encompass the four criteria for an attachment relationship: secure base, safe haven, closeness and separation distress (Zilcha-Mano et al. 2011). Some studies indicate that pet owners feel close to their pets and search for and enjoy this closeness (Enders-Slegers 2000

; Hall et al. 2004; Kurdek 2008; Prato-Previde et al. 2006). Furthermore, they consider pets to provide a sense of safety, supplying their owners with relief, support, affection, and comfort when it is needed (Allen et al. 2002; Geisler 2004; Kurdek 2008; Odendaal and Meintjes 2003). Pets can also be seen as a safe base from which their owners might gain the confidence to take part in activities, pursue opportunities, take risks and explore the wider world (Cusack 1988; McNicholas and Collis 1995).

Demographic Variations in Ownership and Attachment to Pets

In the UK between 64 to 67% of children live in a household with a pet (Westgarth et al. 2010). Childhood experience of animal companions can differ between demographic, cultural and ethnic groups with different degrees of attachment to pets, and this may affect individual behaviour and future choices in relation to pet ownership (Al-Fayez et al. 2003; Siegel 1995; Westgarth et al. 2013). Consequently,

experiences concerning pets in childhood may have long-lasting effects for people (Esposito et al. 2011; Kruger et al. 2012; Serpell and Paul 2011).

There is little data relating to the study of demographic aspects of children's attachment to pets. However, some have reported that as age increases, the attachment to pets seems to decrease (Davis and Juhasz 1985; Vanhoutte and Jarvis 1995; Vidovic et al. 1999). Girls appear more attached to pets than boys (Brown 2003; Holcomb et al. 1985; Kidd and Kidd 1980). There is a positive association between pet ownership in childhood and adulthood and greater attachment to pets (Crawford et al. 2006; Vidovic et al. 1999). Some studies report ethnic variation; for example higher attachment to pets in white children in comparison to black children (Brown 2003; Siegel 1995); others have not found any differences between white children and other ethnic groups (Westgarth et al. 2013). To our knowledge, previous research has not reported any relationship between family wealth and rurality and attachment to pets.

Attachment to Pets and Health and Wellbeing

Regarding health benefits, it is said that young people who are attached to their pets consider them as a member of the family (Rynearson 1978; Siegel 1995; Stevens 1990). This can be seen as one of the most important socio-emotional aspects of the link between young people and their pets and the consequent social support that these relationships can offer (Covert et al. 1985; McNicholas et al. 2005). Furthermore, close and attached relationships with pets have also been related to more pro-social behaviour among children and the development of empathy to other children and adults (Kruger et al. 2012).

It has been proposed that pets may offer a form of social support to children, for example having a role in modulating stress reactivity (Bardill and Hutchinson 1997;

Martin and Farnum 2002; Sobo et al. 2006). It has been shown that the presence of animals can reduce indicators of stress in people over a variety of situations and at all stages of life (McNicholas et al. 2005). An explanation for this could be that animals provide a non-judgmental social support to human beings which in turn produces a calming effect (Kruger et al. 2012).

This paper builds on previous research to provide a detailed assessment of the psychometric properties of the SAPS. This scale has potential to be widely applicable in English-based studies because the wording of the items is simple and easy to interpret. The SAPS is also succinct and may be used in questionnaire-based surveys, interview studies and as an evaluation tool for animal welfare and education interventions (Sprinkle 2008; Vockell and Hodal 1980).

The study addresses the following research questions: 1) Is the SAPS a reliable and valid measure?; 2) Is the SAPS associated with age, gender, ethnicity, rurality, family wealth, quality of life and life satisfaction?; 3) What variables in our study explain higher levels of attachment to pets assessed by the SAPS?

2. Scale Development

The SAPS was developed by Muldoon and Williams (Muldoon and Williams 2010) during the early stages of a study designed to examine how to best promote a duty of care towards animals among children and young people. Following a comprehensive review of the literature (Muldoon et al. 2014), two small-scale empirical studies were carried out with children in order to: fill some of the gaps highlighted within the review; inform the development of a school-based intervention and assess the utility/suitability of measures developed in the US context for UK-based children. The first of these was qualitative; a series of focus groups that explored children's relationships with their pets and their perceptions of the ways in

which they were cared for within the family (see Muldoon et al. in press). The second study involved a small survey (n=121) investigating the links between attitudes, attachment and empathy(Williams et al. 2010). Together, these two studies provided an ideal opportunity to scope the possibility of developing a succinct scale of attachment to pets that could be used more widely to investigate the benefits or otherwise of having a strong relationship/ emotional bond with a pet. The survey allowed the research team first to trial existing measures and subsequently identify how items might be combined to best effect within a reduced scale. The qualitative data helped in the identification of initial scales to use within the survey and subsequently, during analysis, in choosing optimal items (i.e. those that were most salient in children's descriptions of their relationships with pets and those that matched the language they used). Within the survey, sub-scales from three existing measures assessing different elements of attachment to pets were employed. These were chosen, following extensive review of available scales, as they appeared most suitable for measuring the attachment to pets that is expressed by children aged 9 to 13 years. Two of three subscales from the Modified Pet Attitude Scale (PAS-M) (Templer et al. 1981; Munsell et al. 2004) originally intended to measure 'love and interaction' and 'joy of pet ownership' (8 items); The Attachment to Pets Scale (APS) (Staats et al. 1996; Kafer et al. 1995) that measures 'affectionate companionship', 'equal family member status', 'mutual physical activity' and 'pet problems' (12 items) and the 'General Attachment' subscale (11 items) of the Lexington Attachment to Pets Scale (LAPS) (Johnson et al. 1992).

A five-point Likert scale was used, in which children could respond anywhere between 1 for "strongly agree" and 5 for "strongly disagree". A low score reflected stronger attachment to pets. One item from the PAS-M was scored in the opposite

direction, which was useful in ensuring there was no positive response bias and that children were paying attention to the questions.

There was a significant overlap in the items/constructs that each scale/sub-scale measured, but they were all used in their entirety in order to provide the widest range from which to choose. It was conceivable that one of the existing measures might function well on its own in a reduced form, though it was possible to discern subtle but possibly important differences between the three scales in the components of attachment to pets. A number of minor amendments to wording were made before the survey was administered. This was to remove any problems associated with the use of language or phrasing that is unconventional within the UK context. Children were then asked to carefully read through the questions on the survey and tell the researcher present if there was anything they did not understand or did not want to answer. This was framed in such a way that children were asked to be 'helpers': if they didn't understand a question, there would be many more children who would also struggle. Therefore, it was important that the researchers knew which questions were easy to answer and which ones were difficult to read, understand or answer. All queries/notifications were recorded and examined later when the quantitative analysis began.

A series of analyses was undertaken with the dataset that are detailed in Muldoon and Williams(Muldoon et al. 2009) and culminated in a proposed 9-item scale for use within HBSC (5 items from PAS-M, 2 items from APS and 2 items from LAPS). These are displayed in Table 1. As 95% of the respondents had chosen 'strongly disagree' for the 'I hate animals' question on the PAS-M, and a scale reliability analysis suggested removal of this item, this was not included in the factor analysis for the proposed SAPS. However, inclusion of a negatively worded item within the

SAPS was deemed important so that the questions would not lead children to answer in socially desirable ways. 'I don't really like animals' was recommended as a less dramatic version of the question to use.

Insert Table 1 here.

3. Validation process

The SAPS was included in the English and Scottish Health Behaviour in School-Aged Children (HBSC) Surveys as part of the 2009/2010 wave of the WHO Collaborative Cross-National Study. Full details of the HBSC survey protocol are available from www.hbsc.org(Currie et al. 2010). HBSC is a school-based survey that examines the health and health behaviours of pupils aged 11, 13 and 15 and includes a wide range of social measures related to the determinants of health and wellbeing among adolescents related to family life, peer relations, school environment and socioeconomic conditions(Currie et al. 2012).

The HBSC study uses an anonymous self-administered questionnaire, which was according to international standards and distributed in schools (Roberts et al. 2009) All member countries are involved in a continuous process of development and validation of the questionnaire. There are several studies on many topics that have demonstrated the validity of the survey (Clarke et al. 2011; Currie et al. 2008; Ravens-Sieberer et al. 2010; Wardle et al. 2002)

3.1. Participants

A total of 11228 pupils completed the 2010 HBSC survey which was administered to classes of pupils in a random sample of classes in schools in England and Scotland. Details of the samples and survey response rates are reported elsewhere(Brooks et al. 2011; Currie et al. 2011b) .For the purposes of the SAPS validation, data from the

two surveys were combined and weighted and only children who reported that they owned a pet were included in the analysis (N=7159; 69.2% of the total sample).

Each country had the same sampling strategy following the international protocol of the HBSC Study which specifies a minimum sample of 1550 for each age group (11,13 and 15 years)(Currie et al. 2011b)

The number of participants in each country was: England, 4457; Scotland, 6771. The sample was weighted using a stratified clustered sample analysis. The primary clusters were school identification. The list of all schools was stratified by country and by local authorities, so that it was representative of the population. The weighted sample was characterised as follows: England 3968(37%), Scotland 6771(63%).

Table 3 shows the socio-demographic characteristics of pet owners: 3952 (55.2%) were girls with a mean age of 13.66 (SD = 1.66), 5672 (79.2%) were living in urban areas and 6719 (93.8%) reported white (UK) ethnic backgrounds. 2677(37.4%) reported a low family wealth. 5156 (72.9%) reported considering their pet as their own.

3.2. Variables and instruments

HBSC survey includes multiple socio-demographic and health variables. For this paper, the following demographic measures were included in the analysis: gender (1 = male; 2= female), age (1 = 11 years old; 2 = 13 years old; 3 = 15 years old), ethnicity (1= White; 2 = Mixed; 3 = Asian; 4= Black; 5 = Other), country (0 = Scotland; 1 = England) considering a pet as their own (1 = Yes, 2 = No) and rurality (0= Urban; 1 = Rural). Rurality in England was classified using Rural/Urban Local Authority Classification from the Department for Environment, Food and Rural Affairs (DEFRA 2011) and in Scotland using the Scottish Government Urban/Rural Classification from the National Records of Scotland (NRS 2012).

The validated Family Affluence Scale (FAS) (Batista-Foguet et al. 2004) was included in analysis as a measure of family wealth that assesses adolescents' absolute socio-economic status based on material markers and is related to commonly used indices of material deprivation (Carstairs and Morris 1990) and home affluence (Wardle et al. 2002). The FAS II version of the scale was used (Currie et al, 2008); it comprised the following survey questions (with coding) : 1) Does your family own a car, van or truck? (No = 1, Yes, one = 2, Yes, two or more = 3); 2) Do you have your own bedroom for yourself? (No = 1, Yes = 2); 3) During the past 12 months, how many times did you travel away on holiday with your family? (Not at all = 1, Once = 2, Twice = 3, More than twice = 4); 4) How many computers does your family own? (None = 1, One = 2, Two = 3. More than two = 4). A composite FAS II score was calculated. For our analysis, we used a tertile classification where FAS is low (score=0,1,2) indicates low affluence, medium FAS (score=3,4,5) indicates middle affluence, and high FAS (score=6,7,8,9) indicates high affluence.

The following measures were also chosen to gather information about child and adolescent health and wellbeing:

1) The Kidscreen 10 index (Ravens-Sieberer et al. 2010).This consists of a validated 10-item likert-scale that assesses children's and adolescents' subjective health and well-being. It is a self-report measure applicable for healthy and chronically ill children and adolescents aged from 8 to 18 years. Each item is answered on a 5-point response scale. Kidscreen provides a global one-dimensional score. A low score indicates a poor quality of life, and a high score is indicative of a better quality of life.

2) Life Satisfaction (Cantril 1965): This consists of a scale ranging from 0 to 10. Participants were asked to specify where they would locate themselves on the scale. 10 indicated “the best possible life” and 0 represented “the worst possible life”. The scale has been validated for use with adolescents (Currie et al. 2011a).

3.3. Procedure

The HBSC survey is administered every four years using a common research protocol and national teams can incorporate additional questions of interest in their country . The Ethics Committees of the University of St Andrews and the University of Hertfordshire approved the protocol. Following provision of information about the survey, parents could opt their children out of the survey and young people themselves could also opt out of participation, Data collection was anonymous and the demographic information collected did not allow identification of the participants.

3.4. Statistical analyses

The overall SAPS score was calculated by collecting responses to the 9 items. As answers were coded as 1 (Strongly agree), 2 (Agree), 3 (Not sure), 4 (Disagree) and 5 (Strongly disagree), the score was the sum of items and ranged from 9 to 45. For the validation of the scale items 2-9 were reverse recoded, so higher scores indicated higher levels of attachment.

The psychometric testing of SAPS involved the assessment of internal reliability, construct validity and convergent validity. Internal validity was tested through Cronbach’s alpha coefficient and item-total correlations.

Without an established gold standard measure, the validation process was based on construct validity. We performed an explanatory factor analyses. Furthermore, to assess convergent validity, we examined the association of the SAPS score with socio-demographic and health variables. For all aforementioned associations,

Pearson Correlation (Quality of Life and Life Satisfaction); t-tests (gender, rurality, country, considering a pet as their own); and one way analysis of variance ANOVA with post-hoc Bonferroni (ethnicity, age, FAS) were used. Finally, we performed a General Linear Model (GLM) to study what variables were associated with higher levels of attachment to pets.

4. Results

4.1Reliability

The internal consistency coefficient (Cronbach's alpha) was 0.894 for the total scale. The analyses suggest that a deletion of any of the items would not substantially increase Cronbach's alpha. The greatest increase in alpha would come from deleting item 1, but removal of this item would increase alpha only by 0.015. In the item analysis, item- total correlations ranged from 0.368 to 0.784. The item "Pet makes me happy" had the highest correlations (0.784). All items correlated with the total scale to a good degree (see Table 2).

Insert Table 2 here

4.2 Factor Analysis

To determine the construct validity of the SAPS a factor analysis was conducted. Kaiser–Meyer–Olkin (KMO) measure of 0.915 showed that the sample size was adequate for factor analyses and the significant Bartlett test (X^2 =32896.732; $p < 0.001$) showed that the correlation matrix of the scale items was appropriate for factor analyses

To determine the factor structure of the SAPS a Principal Component Analysis (PCA) with varimax rotation was conducted with the result of a single factor accounting for 67.78% of the variance.

4.3 *Attachment levels and associations between SAPS and socio-demographic variables.*

The sum of the total scale was 33 (SD = 8.93) and considering that the sum of the items of the scale ranges from 9-45, it can be said that respondents showed an average attachment. Similar results were found in the average scores of 9 items (Mean = 3.66, SD = 0.99), and also in each item separately (see Table 2).

Bivariate analysis between attachment total score to pets and 7 independent variables were shown in table 3. Girls (Mean = 35.53, SD = 7.72) reported more positive attachment to pets compared to boys (Mean = 33.71, SD = 7.84) ($t(6717) = 9.49$, $P = <0.001$).

Attachment to pets differed significantly across the 3 age groups ($F_{(2, 6991)} = 256.085$, $P = <.001$). Bonferroni's comparisons of the 3 groups indicate that 11 year-olds children (Mean = 37.41, SD = 7.01) had more positive attachment to pets compared with 13 year-olds (Mean = 34.81, SD= 7.58) $p < .001$ and 15 year -olds (Mean = 32.30, SD= 7.96) $p <.001$. 13 year old children (Mean = 34.81, SD= 7.58) also had more positive attachment compared with 15 year old children (Mean = 32.30, SD= 7.96) p< 001).

When considering rurality, no differences were found between children from rural (Mean = 34.60, SD = 7.84) and urban (Mean = 34.75, SD = 7.83) areas ($t (6719) = 0.66$, $P = .508$).

Regarding ethnicity, there was a statistically significant difference between groups as determined by one-way ANOVA ($F_{(3, 6717)} = 25.792$, $P = <.001$). Post-hoc analysis (Bonferroni) demonstrated that white children (Mean = 34.91, SD = 7.70) showed more positive attachment to pets than Asian (Mean = 30.73, SD = 9.28) p<.001, and Black children (Mean = 30.54, SD = 9.68) p <. 001. Other significant differences

were also found among the other non-white ethnic groups: ‘Mixed’ children (Mean = 33.82, SD = 8.27) had more positive attachment than Asian (Mean = 30.73, SD = 9.28) p <.001 and Black children (Mean = 30.54, SD = 9.68) p <. 001.

No significant differences between the SAPS as a function of Family Affluence Scale (FAS) categories (Low, Medium and High) were found. ($F_{(2, 6718)}$ = 17.32, P = 0.124). Children who considered their pet as their own (Mean = 36.04, SD = 7.04) showed higher attachment to pets than those children who did not feel they had a pet of their own (Mean = 31.29, SD =8.72) (t (2763.441) = 20.79, P = <0.001).

Insert Table 3 here

4.4 Associations between the SAPS and Health and Wellbeing

Pearson Correlation Coefficients were computed to assess the relationship between SAPS and quality of life and life satisfaction. Overall, there was a positive correlation between SAPS and quality of life and life satisfaction with higher scores in quality of life (r = .116, p <.001) and life satisfaction (r = .059, p <.001) both being related to higher attachment to pets.

4.5. Predictors of attachment to pets

A General Linear Model was applied to the SAPS (Dependent Variable = the sum of the total scale) to establish which variables (Independent Variables = age, gender, "consider pet as their own", ethnicity, quality of life and life satisfaction) explained (β and η_p^2) high levels of attachment to pets (SAPS) after confirming: linearity of relations (Tabachnick and Fidell 2001) (scattergrams between SAPS and correlated independent variables); the lack of multicollinearity among explanatory variables (tolerance coefficient and the Variance Inflation Factor); the independence of errors (Durwin-Watson test); Normality of the errors (histogram and P-P normal graphic) and homoscedasticity of the errors (visual inspection of residuals).

A linear regression analysis revealed that the following variables explained 15.7% of the variance in attachment to pets. In order of importance, these variables were: Considering a pet as their own (η_p^2= 0.066); being 11 years old (η_p^2= 0.059); being a girl (η_p^2 = 0.014); being 13 years old (η_p^2 = 0.013); white ethnicity (η_p^2 = 0.010); and quality of life (η_p^2= 0.002) –see table 4-.

Insert Table 4 here

5. Discussion

This is the first study to develop and test a short scale to assess attachment to pets among children and young people. This could be employed in future surveys or clinical settings among children and young people.

The SAPS was developed through two small-scale empirical studies that were carried out with children and young people in order to: fill some of the gaps highlighted within the review; inform the development of a school-based intervention and assess the utility/suitability of measures developed in the US context for UK-based children. In the first one, a series of focus groups that explored children's relationships with their pets and their perceptions of the ways in which they were cared for within the family (see Muldoon et al. in press) helped in the identification of initial scales to use within the survey and subsequently, during analysis, in choosing optimal items.

The second study involved a small survey (n=121) investigating the links between attitudes, attachment and empathy(Williams et al. 2010). A series of analyses was undertaken with the dataset that is detailed in Muldoon and Williams(Muldoon et al. 2009) and culminated in a proposed 9-item scale for use within HBSC (5 items from PAS-M, 2 items from APS and 2 items from LAPS).

Together, these two studies provided an ideal opportunity to scope the possibility of developing a succinct scale of attachment to pets that could be used more widely to investigate the benefits or otherwise of having a strong relationship/emotional bond with a pet. The survey allowed the research team to first trial existing measures and subsequently identify how items might be combined to best effect within a reduced scale.

In terms of the psychometric aspects of SAPS, these initial outcomes were very satisfactory. Internal consistency was established through 2 different statistics: 1) Cronbach's alpha was 0.894 and above the arbitrary threshold of 0.70 (Kline 1993; Nunnaly 1978); 2) all item-total correlations coefficients were above the suggested level of 0.2 (Streiner and Norman 2003).

The construct validity of the scale was evaluated through factor analysis and principal component analysis. When performing factor analysis in our sample, all items met in a single factor. This outcome confirms that attachment to pets may be conceived as a general measure, characteristics that facilitate their inclusion, analysis and interpretation in children and young people health surveys such as the HBSC survey. Furthermore, from a theoretical perspective our scale was created considering the four main aspects of attachment to pets distinguished by Melson (1990), such as (1) time with and activities directed toward the attachment object;
(2) interest in and affect expressed toward the attachment object; (3) knowledge about the attachment object; and (4) behavioural responsiveness to the attachment object.

We also found that variability in attachment to pets was associated with socio-demographic and health variables separately measured in the HBSC study. According to Murphy and Myors (2004) the effect sizes of these variables were

medium in the case of the variables ‘age 11’ and ‘consider pet as their own’ and small for the rest of the variables (ethnicity, age 13, gender and Quality of Life). These consistent findings provide strong support for the validity of the new measure. With respect to age, a decrease in positive attachment to pets was found with increasing age: 11 year olds had the highest attachment to pets followed by 13 year olds, which is in line with previous work that highlights a decline in children’s interest in animals with age(Williams et al. 2010; Prokop and Tunnicliffe 2010). This is likely to reflect the development of other interests in adolescence including personal, physical and social development and a greater interest in peers rather than what happens around their family settings (Vidovic et al. 1999).

The variable ‘considering a pet as one’s own’ was positively associated with the SAPS. This fits with the evidence that spending a lot of time with pets and sharing significant moments with them is strongly associated with positive attachment to pets (Muldoon et al. 2009; Williams et al. 2010). Through experience of living with animals and taking responsibility for animal care, children may become emotionally connected to their animal and this may result in being more attached to pets than those children who do not live with pets or do not have a pet they consider to be their own (Kruger et al. 2012).

In relation to ethnicity, we found that white children reported higher attachment than Asian, Black children. And children of mixed ethnicity reported higher attachment than Asian and Black children. However, due to the sample size of each ethnic group, we decided to include in the model the variable ethnicity recoded in two sub-categories: white children versus non-white children (including Asian, mixed, Black and children from other ethnic backgrounds). White children showed more attachment to pets than non-white children. This is in line with previous research on

children/young people's attachment to pets conducted in the United States (Brown 2003) and in Kuwait (Al-Fayez et al. 2003). However, our findings disagreed with a study conducted in the UK in which white children were not found to be more attached to pets than non-white children (Westgarth et al. 2013). These differences between our results and Westgarth's (Westgarth et al. 2013) study could be due to the difficulties of capturing cultural, historical and religious issues in a single variable in both studies and by the use of different attachment scales within the two studies.

Girls showed stronger attachment to pets than boys which agrees with previous research. Previous research, especially using self-reported scales, has reported similar results in children (Vidovic et al. 1999) and adults (Holcomb et al. 1985; Kidd and Kidd 1990). However, other studies have not found significant differences between gender and attachment to pets (Ganster and Voith 1983; Stevens 1990). These contrasting results may mirror differences in the scales used or in the populations assessed to evaluate the attachment to pets (Stevens 1990; Westgarth et al. 2013).

Regarding health related variables, quality of life was included in the model and explained a small percentage of the variance although the effect size of these variables was very small. Studies of adults have found positive effects on health of pet ownership and attachment to pets such as a lower use of medical services (Headey 1999), major survival rates from myocardial infarction (Friedmann et al. 1980), and a lower risk of heart disease (Anderson et al. 1992). Among children there is evidence of a lower risk of allergic rhinitis and asthma in children exposed to pet allergens (Nafstad et al. 2001; Ownby et al. 2002) and lower absenteeism from school due to illness in children and young people who live with pets (McNicholas et al. 2005). Other studies have found no impact or even negative effects on quality of

life of pet ownership and attachment to pets in adults (Gilbey et al. 2007; Herzog 2010; Miltiades and Shearer 2011; Parker et al. 2010; Wright et al. 2007) and undergraduate students (Straatman et al. 1997). Although Herzog (2011) has concluded that the link between human-pet relationships and health benefits is not clear given the huge amount of contradictory results, our research suggests that pet ownership and attachment to pets may have a potential effect on children's and young people's health and wellbeing, thus making this area worthy of further research.

This validation of the psychometric qualities of SAPS provides a tool to explore the influence of pets on a range of health related outcomes. This research has been progressed within the context of a large-scale survey of health and lifestyles (HBSC) through including the SAPS items in the survey questionnaire in England and Scotland. In the long term, other HBSC member countries in Europe and North America may adopt SAPS, thus enabling collaborative enquiry into cross-country differences.

In the broader context, SAPS will facilitate further health-related research that will inform the development of educational programs to implement positive attachment towards animals. Education is considered important to forming attitudes (Ajzen and Fishbein 2000). Including pet welfare topics in the curriculum can stimulate responsible and healthy behaviour among children and young people and offer the possibility to build a stable structure for our society that gives more value to pets. However, it is important to know how attachment to pets can be enhanced and combined with other variables to influence positive behaviour to animals (Bamberg and Moser 2007; Baxter Powellab et al. 2011; Webb and Sheeran 2006).

Conclusion

To a certain extent our research supports the positive association between attachment to pets in children and adolescents and some socio-demographic aspects and Quality of Life. Unfortunately, the cross-sectional design of our survey does not supply insight into cause and effect relationships of attachment to pets and socio-demographic and health and wellbeing aspects. It is unclear whether attachment to pets has direct effects on health and well-being dimensions or whether specific socio-demographic aspects are related with higher levels of attachment to pets. These questions may be answered in future by longitudinal studies.

Despite these limitations, we consider that our scale has contributed to facilitate a tool for future research on attachment to pets in children and young people and its relationships with socio-demographic and health aspects.

Abbreviations

SAPS: Short Attachment to Pets Scale; HBSC: Health Behaviour in School-Aged Children Survey; HAI: Human-Animal Interactions; PAS-M: Modified Pet Attitude Scale; APS: Attachment to Pet Scale; LAPS: Lexington Attachment to Pet Scale; WHO: World Health Organization; FAS: Family Affluence Scale; GLM: General Linear Model; KMO: Kaiser-Meyer-Olkin; PCO: Principal Component Analysis.

Competing interests

The authors declare not competing interests

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Authors' details

[1]Child and Adolescent Health Research Unit (CAHRU), University of St Andrew, St Andrews, Fife, KY16 9TF.

[2]Clinical Psychology; University of Edinburgh, Edinburgh.

[3]Scotland´s Rural College, West Mains Road, Edinburgh EH9 3JG

Authors' contribution

AL, CC and JW conceived the study. JM and JW conducted the development of the scale. FMS and MC analysed and interpreted the quantitative data. FMS led the writing of the manuscript. All authors critically reviewed the manuscript and provided comments for revision. All authors read and approved the final version of the manuscript.

Table 1. Selected questions for HBSC survey.

Item	Original question	Question modified	Original scale	Authors
1	I hate animals	I don't really like animals	PAS-M	Templer et al., 1981; Munsell et al., 2004
2	I spend time every day playing with my pet	I spend time every day playing with my pet	PAS-M	Templer et al., 1981; Munsell et al., 2004
3	I have occasionally communicated with my pet and understood what it was trying to express	I have sometimes talked to my pet and understood what it was trying to tell me	PAS-M	Templer et al., 1981; Munsell et al., 2004
4	I love pets	I love pets (no alteration)	PAS-M	Templer et al., 1981; Munsell et al., 2004
5	I frequently talk to my pet	I talk to my pet quite a lot	PAS-M	Templer et al., 1981; Munsell et al., 2004
6	My pet makes me feel happy	My pet makes me feel happy (no alteration)	LAPS	Johnson, Garrity & Stallones, 19920
7	I consider a pet to be a friend	I consider my pet to be a friend (no alteration)	LAPS	Johnson, Garrity & Stallones, 19920
8	My pet knows when I'm upset and tries to comfort me	My pet knows when I'm upset and tries to comfort me (no alteration)	APS	Staats et al., 1996; Kafer et al., 1992
9	There are times I'd be lonely except for my pet	There are times I'd be lonely without my pet (no alteration)	APS	Staats et al., 1996; Kafer et al., 1992

Pets Attitude Scale (PAS-M); Lexington Attachment to Pet Scale (LAPS); Attachment to Pets Scale (APS)

Table 2. Mean scores, psychometric properties and correlations between scores on the SAPS scale and other measures of physical activity and quality of life.

Items	Mean Scores	Cronbach's alpha if items deleted	Correlation item-Total
1. I don't really like animals	4.39 (1.077)	.909	.368
2. I spend time every day playing with my pet	3.88(1.12)	.882	.664
3. I have sometimes talked to my pet and understood what it was trying to tell me	3.32 (1.33)	.884	.647
4. I love pets	4.37 (0.90)	.883	.672
5. I talk to my pet quite a lot	3.51 (1.313)	.878	.713
6. My pet makes me feel happy	4.13 (1.013)	.874	.784
7. I consider my pet to be a friend	3.88 (1.179)	.872	.782
8. My pet knows when I'm upset and tries to comfort me	3.52 (1.317)	.879	.700
9. There are times I'd be lonely without my pet	3.69 (1.304)	.877	.720

Table 3. Relation between socio-demographic and health variables to attachment to pets

Attachment to pets total score					
	N (%)	Mean	Std. Deviation	t	Post Hoc #(Bonferroni)
Gender					
Boy	3207(44.8)	33.71	(7.84)	9.49**	
Girl	3952(55.2)	35.53	(7.72)		
Location					
urban	5672(79.2)	34.75	(7.83)	0.66ns	
rural	1489(20.8)	34.60	(7.84)		
Pet as their own					
No	1918(26.8)	31.29	(8.72)	20.79**	
Yes	5156(72.9)	36.04	(7.04)		
Age				$F_{(2,6991)}$**	
11	2281(32)	37.41	(7.01)	256.085	11>13**, 15**
13	2360(33.1)	34.81	(7.58)		13>15**
15	2488(34.9)	32.30	(7.96)		
Ethnicity				$F_{(3,6717)}$**	
White (W)	6719(93.8)	34.91	(7.70)	25.792	W> A**, B**
Mixed (M)	149(2.1)	33.82	(8.27)		M> A*, B*
Asian (A)	202(2.8)	30.73	(9.28)		
Black (B)	91(1.3)	30.54	(9.68)		
FAS				$F_{(2,6718)}^{ns}$	
Low FAS (L)	2677(37.4)	34.89	(7.93)	17.32	
Medium FAS (M)	2319(32.4)	34.79	(7.70)		
High FAS (H)	2165(30.2)	34.43	(7.82)		

* P < 0.005

**P < 0.001

Only significant differences between groups are depicted

Table 4. Sociodemographic and health variables associated with attachment to pets

Variables included in the model	B	p Value*
Age (11 years old)	4.57	<0.001
Age (13 years old)	2.09	<0.001
Gender (Girls)	1.74	<0.001
Consider a pet as their own (Yes)	4.30	<0.001
Ethnicity (White)	2.99	<0.001
Quality of Life(Kidscreen)	.045	<0.001

R2 adjusted = 0.157

Variables excluded from the model: Llife satisfaction

* $p < 0.05$ was considered significant

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